Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

SUSTAINABILITY PERFORMANCE AND FINANCIAL CONSTRAINTS IN REAL ESTATE: EVIDENCE FROM GLOBAL REITS AND REAL ESTATE MANAGEMENT FIRMS

Shahbaz Ul Hassan Bhatti [1], Muhammad Nawaz [2], Mudeer Ahmad Khattak [3]

DOI: https://doi.org/10.63544/jbii.v5i11.278

Affiliations:

[1] PhD scholar Finance, Department of Business Administration, IQRA University, H-9 Campus, Islamabad
Email: shahbazulhassanbhatti@gmail.com

[2] Associate Professor Finance, Department of Business Administration, IQRA University, H-9 Campus, Islamabad, Pakistan
Email: muhammad.nawaz@iqraisb.edu.pk

[3] Associate Professor Finance, Sunway Business School, Sunway University, Malaysia
Email: mudeerkhattak@gmail.com

Corresponding Author's Email:

[1] shahbazulhassanbhatti@gmail.com

Copyright:

Author/s

License:

open access

Article History:
Received: 04.10.2026
Accepted: 27.10.2026
Published: 03.11.2026

Abstract

Buildings account for about 39% of global energy-related carbon emissions. Sustainable projects such as green retrofits are capital intensive and property firms find it difficult to secure finance for them. Sustainability reporting by property investors has expanded alongside climate policy, yet it is unclear whether sustainability performance eases or tightens access to finance for property firms. This study examines whether the sustainability performance of listed real estate firms is associated with lower financial constraints. The sample covers 505 firms from 45 countries and 4,826 firm-year observations between 2010 and 2023. It includes 275 real estate investment trusts (REITs) and 230 management and development firms. Financial constraints are measured with the Whited and Wu (WW) index. Sustainability performance is measured by a composite score and by its environmental, social and governance pillars. Fixed effects regressions with firm and year effects and standard errors clustered by firm are estimated for the full sample, for each business model and for developed and developing economies. The composite score is associated with lower financial constraints in the full sample and for both business models, with a larger coefficient for management and development firms. The association is significant in developing economies and insignificant in developed economies. Within developing economies, it is significant for management and development firms but not for REITs. The environmental and social pillars are significant in the full sample and for management and development firms. For REITs only the social pillar is significant. The governance pillar is not significant in any specification. Because real estate shapes cities through construction, operations and use of urban space, the evidence is relevant to lenders, investors and policymakers who pursue sustainable urban development in line with SDG 11 on sustainable cities and communities.

Keywords: Sustainable Urban Development, ESG, Real Estate, REITs, Access to Finance, Financial Constraints

1. Introduction

Buildings are a major source of carbon emissions. Adams et al. (2019) report for the World Green Building Council that they account for 39% of global energy-related carbon emissions. The Paris Agreement aims to hold the rise in global average temperature well below 2°C and to make finance flows consistent with low-emission and climate-resilient development (United Nations Framework Convention on Climate Change, 2016). Sustainability reporting by property investors has expanded alongside this policy focus. GRESB (2023) reports that its real estate assessment covered 2,084 listed and non-listed portfolios with about USD 7.2 trillion of gross asset value (about USD 8.8 trillion across its real estate and infrastructure assessments).

Access to finance is central to how property firms can respond to this agenda. Real estate projects are capital intensive. The pool of investors seeking real asset exposure is relatively limited, which gives individual funds and banks scope to affect the cost of capital that projects face (Caldecott et al., 2026). REITs add a regulatory feature, because distribution requirements are linked to higher reliance on debt (Dogan et al., 2019). A firm is financially constrained when external finance is costly or hard to obtain. Whited and Wu (2006)

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

build an index of external finance constraints from firm characteristics. This study uses that index as its outcome.

Against this background, sustainability performance could ease these constraints. REITs with higher ESG disclosure show a lower cost of debt (Feng & Wu, 2023). Chinese developers with stronger ESG performance face lower financing costs and refinancing pressure (Wang et al., 2026). It could also tighten them. UK practitioners find up-front sustainability costs hard to justify (Jackson & Orr, 2021), and small firms may face financial pressure from governance investment in stable periods (Nguyen & Nguyen, 2024). Which effect prevails is an empirical question.

The evidence on ESG and financing in real estate is partial. Studies of listed real estate mostly examine performance, risk or the cost of debt. Hayar et al. (2025) link ESG to market performance and capital costs in 38 countries, while Feng and Wu (2023) study the debt market for REITs and Wang et al. (2026) cover developers in China. Direct tests of the link between ESG and financial constraints come from outside real estate, mainly from Chinese samples of listed firms (Bai et al., 2022; Hao & Wu, 2024; Liao et al., 2025). On the lender side, Bressan (2024) studies the ESG scores of banks and not those of borrowers. Among the studies reviewed in Section 2, none estimates the relation between ESG performance and a financial constraint measure for REITs and for management and development firms within one design, with the pillars and the development status of the economy examined separately.

This study examines whether the sustainability performance of listed real estate firms is associated with lower financial constraints and examines three questions. Is sustainability performance associated with lower financial constraints for listed real estate firms? Does this association differ between REITs and management and development firms? Is it present across the three pillars and in both developed and developing economies?

This study contributes to the literature in four ways. First, it examines financial constraints as the outcome. The Whited and Wu index measures the extent to which firms face external finance constraints. It complements debt cost outcomes because it does not rest on the price of debt alone. Second, it widens the coverage. The sample spans 45 countries and 14 years and includes REITs and management and development firms in one design. Third, it provides pillar-level evidence and estimates the relation separately for developed and developing economies on a constraint measure for real estate firms. Fourth, evidence on where sustainability performance and access to finance are linked and where they are not is relevant to firm managers, lenders that assess sustainability information and policymakers who design disclosure and financing frameworks.

The paper is organized as follows. Section 2 reviews the related literature and sets out the conceptual channels linking sustainability performance to financial constraints. Section 3 describes the data and the methodology. Section 4 presents and discusses the results. Section 5 concludes with a summary of the findings and implications for real estate finance and sustainable urban development.

2. Literature Review

2.1 Real Estate and the Sustainability Transition

Of the 39% of global energy-related carbon emissions attributed to buildings (Adams et al., 2019), 28% come from operations and 11% from materials and construction. The World Economic Forum (2024), in a report prepared with Boston Consulting Group, attributes 37% of global carbon dioxide emissions to buildings. The two figures use differently defined emissions bases, so they are best read as complementary indicators of the sector's weight. Taken with the emissions figures above and the finance goal of the Paris Agreement (Section 1), this means that the way buildings are financed falls within the climate agenda, alongside the way they are built and operated.

Investor attention to real estate sustainability has grown alongside this policy focus. GRESB (2023), the ESG benchmark for real assets, covers 75 countries and regions in its 2023 real estate assessment. Participation rose by 15% in that year. A substantial volume of property assets is therefore reported against a common sustainability benchmark. This makes it plausible that sustainability information also reaches lenders and bondholders. Institutional investors also assign a growing target share of their portfolios to the asset class.

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

In the annual allocations survey run by Hodes Weill & Associates and Cornell University's Baker Program in Real Estate, the average target allocation to real estate among surveyed institutions rose from 8.9% in 2013 (Hodes Weill & Associates, 2017) to 10.8% in 2023 (Hodes Weill & Associates, 2023). Listed companies are one route to the asset class and are the population studied in this paper. Section 2.2 reviews how property firms are financed. Section 2.3 then turns to what is known about sustainability and the cost of capital in the sector.

2.2 Financing Real Estate: Capital Structure, Collateral and Payout

Studies of what drives REIT leverage emphasize the role of collateral. Morri and Beretta (2008) analyse 119 US REITs. They find that tangibility is positively related to leverage while more profitable firms carry less debt. They also find that REITs with more growth opportunities carry more debt and read this as consistent with the pecking order theory. Giambona et al. (2008) find that the liquidity of the underlying assets influences REIT capital structure, which suggests that collateral quality matters for borrowing capacity. Harrison et al. (2011) study REIT capital structure decisions between 1990 and 2008. They find support for market timing and trade-off explanations but not for the pecking order theory. They add that debt capacity varies systematically with the operating and financing mechanisms specific to REITs. The evidence on the theory that best fits REIT financing is therefore mixed.

The distribution requirement is the feature that most clearly separates REITs from other property firms. Cross-country evidence supports the role of these rules. Dogan et al. (2019) study REITs from twelve countries and find that legal requirements are significant determinants of REIT capital structure. REITs hold the highest book debt ratios in countries where they must pay out most of their operating income, which the authors read as a preference for debt over equity. Where no payout requirement applies but leverage is restricted, REITs hold less debt, which suggests a preference for internal over external financing. Country-specific factors have no significant effect on REIT leverage in their sample.

Taken together, this literature shows that REIT financing is shaped by collateral and by regulation in ways that set REITs apart from most non-REIT firms. It also motivates the leverage, tangibility, profitability, growth-opportunity and payout variables used in the empirical model of this paper. Whether sustainability performance adds information to a financing process of this kind is the subject of Section 2.3.

2.3 Sustainability, Property Performance and the Cost of Capital

Three theoretical perspectives suggest why ESG performance may ease financial constraints. Stakeholder theory (Freeman, 1984) stresses that firms depend on groups that can affect or are affected by their objectives, including investors and lenders. Cheng et al. (2014) link better CSR performance to lower capital constraints through stakeholder engagement and transparency. The resource-based view (Barney, 1991) treats valuable and hard-to-imitate resources as a source of sustained advantage. ESG capability can be read as such a resource, as it may strengthen efficiency and reputation and so reduce uncertainty for capital providers. Legitimacy theory (Suchman, 1995) concerns the perception that a firm's actions are appropriate within social norms and values. Visible ESG commitments can support that perception, which matters in a sector with high environmental exposure. Against these benefits, the cost of environmental improvements can add financial pressure in the short term. The net effect is therefore an empirical question. The evidence below shows both patterns.

Evidence on the performance effects of ESG in real estate is mixed and appears to depend on market conditions. In European listed real estate, Brounen et al. (2021) report evidence of a sustainability premium, as investors appear willing to pay more for companies with better sustainability ratings. Hayar et al. (2025) study public real estate companies from 38 countries between 2015 and 2021. They report that ESG-aligned firms show higher market performance and improved operational efficiency, which they attribute to reduced capital costs and improved risk management. They also report initial setbacks such as lower net operating income and higher administrative costs. Nguyen and Nguyen (2024) find a less favorable pattern in stable periods. In their analysis ESG does not improve firm success and in some situations hurts it. Firms with better ESG ratings perform strongly during the COVID-19 pandemic and show a stronger ability to recover. The authors caution that small firms may face financial pressure from governance investment in stable periods.

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

Interview and focus group evidence from the United Kingdom points to the same tension between costs and benefits. Jackson and Orr (2021) report that participants saw limited or no evidence of price premia for sustainability in the UK. They also found it hard to justify capital expenditure when costs appear to outweigh benefits and gave priority to financial objectives where the two conflict. These findings concern different markets and objects, listed equities in Europe and direct property investment in the UK.

The closest evidence on financing comes from debt markets. Feng and Wu (2023) use GRESB public disclosure data for REITs around the world. They find that REITs with higher ESG disclosure have a lower cost of debt, higher credit ratings and a higher ratio of unsecured to total debt. They interpret this as better access to capital markets and greater financial flexibility, on the view that lenders consider ESG information when lending. The analysis measures disclosure and not ESG performance. It rests on observations for 2019 and 2020. For Chinese property developers, Wang et al. (2026) find that stronger ESG performance raises profitability through lower financing costs and lower refinancing pressure. They read this as evidence that ESG works as a credible signal in credit markets. The gain is concentrated among large and private developers and disappears or turns negative for firms under severe repayment pressure. After the Three Red Lines deleveraging policy of August 2020, it largely disappears for highly leveraged developers.

Studies outside real estate test the link with financial constraints more directly. Cheng et al. (2014) examine a large cross-section of firms and find that those with stronger corporate social responsibility performance face significantly lower capital constraints. García-Sánchez et al. (2019) report same direction for an international sample with effect working through quality of sustainability reporting. The evidence from Chinese listed firms points the same way: ESG performance is negatively associated with financial constraints, with the easing concentrated in non-state-owned and high-pollution firms (Bai et al., 2022; Guo et al., 2024; Hao & Wu, 2024). Goel et al. (2025) confirm the pattern in a broader setting. Bhatti and Khattak (2025) relate sustainability ratings to the Whited and Wu index in an international sample covering 66 countries and find lower financial constraints for stronger sustainability performance. None of these studies addresses real estate, whose asset structure and financing differ in ways set out in Section 2.2.

Lenders and investors form the other side of this relationship. Caldecott et al. (2026) set out a conceptual framework in which financial institutions can influence firms through the cost of capital and access to liquidity. Drawing on a literature survey and eight practitioner interviews, they argue that individual funds and banks can affect the cost of capital that projects face because the pool of investors seeking real asset exposure is limited. Bressan (2024) shows that the sustainability profile of lenders shapes their real estate exposure. United States banks with higher ESG scores hold smaller shares of real estate and construction loans, and the pattern is significant only for commercial real estate loans. The author reads this as sustainable banks avoiding the ESG risk of real estate lending. The study uses the ESG scores of banks and not those of borrowers, and the author lists borrower-side tests as a topic for future research.

Three points follow for the present study. First, the benefits of ESG performance in real estate appear to depend on firm size, leverage and market conditions, while the costs are incurred up front. Second, the debt-market studies cover either REITs (Feng & Wu, 2023) or developers in one country (Wang et al., 2026) with different ESG measures and periods, so their findings cannot be compared directly. Third, among the studies reviewed here, pillar-level evidence appears only for performance outcomes (Hayar et al., 2025) and for bank behavior (Bressan, 2024). These points motivate a design that examines the composite score and its three pillars separately, allows association to differ between business models and economies and controls for firm characteristics highlighted in Section 2.2.

2.4 Institutional Context: Developed and Developing Economies

Institutional conditions may determine whether sustainability information changes access to finance. Wang et al. (2026) show for China that the benefit of ESG depends on the financing environment. It varies with repayment pressure and was largely removed for highly leveraged developers after the 2020 deleveraging policy. Hayar et al. (2025) report that regional characteristics and the distinction between developed and emerging markets introduce nuances in their global sample. They stress the role of local contexts. Braun et al. (2025) examine ESG ratings and investment efficiency in a 46-country firm panel within the Fazzari-

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

Hubbard-Petersen framework. They report that in emerging markets high ESG ratings are linked to reduced financial constraints. In developed markets firms with higher ratings often deviate from traditional investment paths, which may result in resource misallocation. The authors interpret this as firms in emerging markets using high ESG ratings to secure additional funding, while firms in developed markets face efficiency losses under ESG pressures. Fernández et al. (2025) reach a similar conclusion from interviews in five European countries. They find that ESG financing produces inequalities in access to capital across national financing systems and across individual providers. Their evidence concerns social housing organizations and ESG legislation and not listed firms, so it is indicative only. For REITs, Dogan et al. (2019) find that legal requirements are significant determinants of capital structure across twelve countries (Section 2.2).

Among the studies reviewed in this section, Hayar et al. (2025) compare developed and emerging markets for real estate firms using performance outcomes, and Braun et al. (2025) compare them on financial constraints in a firm panel globally. These studies motivate estimating the relation separately for developed and developing economies and controlling for institutional quality and credit market development.

2.5 Business Model Heterogeneity: REITs and Management and Development Firms

The theoretical perspectives in Section 2.3 need not operate with equal strength in all real estate firms. REITs and property management and development firms differ in how they are regulated and financed. Section 2.2 showed that REITs operate under distribution requirements that shape their capital structure (Dogan et al., 2019). Evidence for developers points to a different set of pressures. Wang et al. (2026) report that the ESG premium of Chinese developers is strongest in housing booms and periods of high policy uncertainty and disappears or turns negative under severe repayment pressure. The evidence on the two groups comes from separate studies. Feng and Wu (2023) study REITs through disclosure, debt costs and credit ratings. They find that disclosure is sensitive to institutional ownership. Fernández et al. (2025) add that the limited new finance linked to ESG goes mostly to large and commercially oriented organizations, which suggests that business model and scale shape access. The two groups therefore differ in regulation and financing. This motivates separate estimation with leverage, tangibility and payout included as controls.

2.6 Contribution and Research Questions

The studies reviewed in previous section point to a financing channel from sustainability to real estate firms. They also show that the evidence is partial in four respects. First, the outcomes studied are debt costs and credit ratings; financing costs and refinancing pressure; and performance or risk measures. Second, the samples cover a short window or a single country. Third, among these studies, pillar-level results appear only for performance outcomes. Fourth, institutional differences are discussed but, among the real estate studies reviewed, rarely examined on financing outcomes within the same design.

This study addresses these points with a global panel described in Section 3 and asks three questions. Is sustainability performance associated with lower financial constraints for listed real estate firms? Does this association differ between REITs and management and development firms? Does it differ across the environmental, social and governance pillars and between developed and developing economies?

3. Data and Methodology

This study employs a global panel dataset of 505 publicly listed real estate firms spanning 2010–2023 covering 4,826 firm-year observations across 45 countries. The sample includes 275 REITs and 230 Real Estate Management and Development (M&D) firms, contributing 2,699 and 2,127 firm-year observations respectively ensuring coverage across different business models. Country-wise distribution (Table 1) shows the largest representation from the United States (1,487 observations) followed by Hong Kong (551), Australia (355), the United Kingdom (331) and Canada (234), with smaller markets such as Peru, Italy and Finland also represented. Industry-wise distribution by year is reported in Table 2.

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

Table 1

Country-Wise Firm Distribution

Ser	Country	Firm Obs	Ser	Country	Firm Obs
1	Argentina	14	24	Mexico	20
2	Australia	355	25	Morocco	14
3	Austria	21	26	Netherlands	39
4	Bahrain	9	27	New Zealand	77
5	Belgium	42	28	Norway	16
6	Brazil	18	29	Peru	6
7	Canada	234	30	Philippines	46
8	Chile	14	31	Poland	13
9	China	136	32	Qatar	19
10	Egypt	14	33	Russia	10
11	Finland	6	34	Saudi Arabia	14
12	France	86	35	Singapore	220
13	Germany	89	36	South Africa	144
14	Greece	6	37	Spain	42
15	Hong Kong	551	38	Sweden	111
16	India	68	39	Switzerland	69
17	Indonesia	35	40	Taiwan	39
18	Ireland	6	41	Thailand	59
19	Israel	9	42	Türkiye	12
20	Italy	5	43	UAE	26
21	Japan	231	44	United Kingdom	331
22	Kuwait	18	45	USA	1,487
23	Malaysia	45		**Total**	4,826

Table 2

Industry-Wise Firm Distribution

Industry	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
REITs	93	101	107	114	122	142	189	214	243	275	275	275	274	275	**2,699**
RE M&D	65	75	82	86	99	112	122	148	188	230	230	230	230	230	**2,127**
Total	**158**	**176**	**189**	**200**	**221**	**254**	**311**	**362**	**431**	**505**	**505**	**505**	**504**	**505**	**4,826**

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

3.1 Dependent Variable

The dependent variable is financial constraints (FC), measured using the Whited Wu (WW) Index, which captures a firm's access to external finance based on firm size, cash flow, leverage and investment opportunities (Whited & Wu, 2006). The WW Index is well suited to real estate firms given their capital intensive nature and reliance on external financing for growth and sustainable development initiatives. A negative coefficient indicates that the associated variable is linked with lower financial constraints.

3.2 Independent Variables

The main independent variable is the Composite Sustainability Score (CSS), drawn from LSEG Refinitiv's ESG data. To examine pillar level heterogeneity, Environmental Performance (ENV), Social Performance (SOC) and Governance Performance (GOV) are each estimated in separate specifications in place of the composite score.

3.3 Control Variables

Firm-level controls comprise Debt to Assets Ratio (DAR), Dividend Payout Ratio, Return on Equity (ROE), Asset Tangibility Ratio (ATR), Tobin's Q, Board Composition (BDC) and Leadership Structure (LDS). BDC and LDS capture firm-level governance (board size and CEO duality respectively) and are distinct from Institutional Quality (IQ), a country-level measure described below. Tobin's Q is constructed as the sum of market capitalization and total debt, divided by total assets. All continuous firm level variables have been winsorised at the 1st and 99th percentiles.

Dividend payout ratio is unavailable for 839 of the 4,826 real estate firm-years. The majority, 681 observations, correspond to firms reporting negative earnings, for which the ratio is mathematically undefined rather than unreported; the remaining gap reflects incomplete vendor coverage. A within firm forward fill was tested as a robustness check; it recovered 88 additional observations, under two percent of the full sample and left the sustainability coefficient and its significance essentially unchanged. The unfilled series is retained throughout.

The industry level control is Property Market Concentration (PMC), a Herfindahl-Hirschman Index computed on total assets within each country-year. Country-level controls are the Economic Growth Rate (EGR), Foreign Investment Inflows (FII), Consumer Price Inflation (CPIN), Institutional Quality (IQ, the World Governance Indicators composite) and Credit Market Development (CMD). Urban Population Growth (UPG) is included as a real-estate-specific demand control, drawn from the World Bank's World Development Indicators; this series has no coverage for Taiwan, since Taiwan's non-membership in the United Nations excludes it from the UN World Urbanization Prospects underlying this indicator. This affects 39 of the 1,725 M&D firm-year observations in the full sample (no REIT observations, since no REIT firms in the sample are incorporated in Taiwan); a trend-based sensitivity check confirmed the main results are unaffected by this exclusion.

Liquidity, real interest rates and gross fixed capital formation were also tested but excluded from the final specification, liquidity due to substantial missing data with no change to the core result once removed, and the latter two due to limited coverage and negligible explanatory power in preliminary estimations.

3.4 Estimation Strategy

All models include firm and year fixed effects. Country and industry fixed effects are omitted, since firm fixed effects absorb both in a panel where a firm's country and industry do not change over time, confirmed empirically in preliminary estimation. A COVID-19 indicator was considered but excluded, since it is collinear with the 2020 year dummy; year effects are retained instead. Standard errors are clustered at the firm level throughout, to account for serial correlation within each firm's panel. To investigate heterogeneity across firm types and economic contexts, separate fixed-effect regressions are estimated for REITs vs Real Estate M&D firms and firms operating in developed vs developing economies.

3.5 Developed and Developing Countries

Countries are classified as developed or developing following the United Nations World Economic Situation and Prospects (WESP) report. Under this classification, Hong Kong SAR, Singapore, Taiwan and Israel are classified as developing economies, consistent with WESP's treatment of East and Western Asia,

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

notwithstanding their advanced-economy status under IMF, World Bank or MSCI classifications. The Gulf states and Turkey are likewise classified as developing under WESP. The Russian Federation is technically classified by WESP as an economy in transition, a category distinct from both developed and developing; it is grouped with developing economies for the purposes of this study's binary classification.

3.6 Empirical Specification

Separate fixed-effects regressions are estimated for the full sample, REITs and M&D firms, and separately for developed and developing economies within each business-model split. The baseline model is:

$$FC_{it} = \beta_0 + \beta_1 CSS_{it} + \beta_2 DAR_{it} + \beta_3 PAY_{it} + \beta_4 ROE_{it} + \beta_5 ATR_{it} + \beta_6 TQ_{it} + \beta_7 BDC_{it} + \beta_8 LDS_{it} + \beta_9 PMC_{ct} + \beta_{10} EGR_{ct} + \beta_{11} FII_{ct} + \beta_{12} CPIN_{ct} + \beta_{13} IQ_{ct} + \beta_{14} CMD_{ct} + \beta_{15} UPG_{ct} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

where FC_{it}denotes financial constraints for firm i at time t. CSS_{it}denotes the composite sustainability score. Equation (1) is re-estimated three times with CSSit replaced by the environmental pillar score (ENV_{it}) or the social pillar score (SOC_{it}) or the governance pillar score (GOV_{it}) while the controls and fixed effects stay unchanged. The Debt-to-Assets Ratio (DAR), Dividend Payout Ratio (PAY), Return on Equity (ROE), Asset Tangibility Ratio (ATR), Tobin's Q (TQ), Board Composition (BDC) and Leadership Structure (LDS) are firm-level controls; Property Market Concentration (PMC), Economic Growth Rate (EGR), Foreign Investment Inflows (FII), Consumer Price Inflation (CPIN), Institutional Quality (IQ), Credit Market Development (CMD) and Urban Population Growth (UPG) are property market and country-level controls, hence the ct subscript; $\mu_i$and $\lambda_t$are firm and year fixed effects and $\varepsilon_{it}$is the idiosyncratic error term, clustered by firm.

4. Results and Discussion

Broadly sustainability performance eases financial constraints across the global real estate sector, but the effect is concentrated in developing economies and concentrated in Environmental and Social performance rather than Governance at the pillar level. Real Estate Management and Development (M&D) firms show a stronger and more consistent relationship than REITs whose financing instead depends more heavily on firm level capital structure and country level institutional conditions.

4.1 Descriptive Statistics

Table 3 presents descriptive statistics for the sample of 4,826 firm-year observations spanning 2010–2023. The mean Financial Constraints (FC) index is −0.374 (SD = 0.057). The Composite Sustainability Score (CSS) averages 45.57 (SD = 20.76), with Environmental, Social and Governance Performance averaging 39.80, 48.33 and 48.93 respectively, indicating that real estate firms in this sample report comparatively weaker environmental disclosure than social or governance disclosure. Firm level controls show a mean Debt-to-Assets Ratio of 0.37 (SD = 0.15), a mean Dividend Payout Ratio of 0.92 (available for 3,987 of 4,826 observations, discussed further below), a mean Return on Equity of 0.07 (SD = 0.23), a mean Asset Tangibility Ratio of 0.76 (SD = 0.28) and a mean Tobin's Q of 1.08 (SD = 0.90), indicating that the average firm trades close to the replacement cost of its assets.

Board Composition averages 8.74 members, with CEO duality present in 29% of firms. Property Market Concentration averages 0.14, reflecting varied competitive structures across country year markets. Macroeconomic controls show average Economic Growth of 2.24%, Foreign Investment Inflows of 6.68% of GDP and Consumer Price Inflation of 2.81%. Institutional Quality averages 1.08 (SD = 0.57), and Credit Market Development averages 157.56 (SD = 51.30). Urban Population Growth averages 1.05% annually.

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

Table 3
Descriptive Statistics

Variable	Count	Mean	SD	Min	Max
Financial Constraints (FC)	4688	-.3736361	.0569617	-.5443233	-.1564267
Composite Sustainability Score (CSS)	4826	45.5712	20.7601	1.603834	92.90577
Environmental Performance (ENV)	4826	39.7965	29.67108	0	98.43658
Social Performance (SOC)	4826	48.33443	22.02133	.9086879	98.63216
Governance Performance (GOV)	4826	48.9308	22.40341	.2490618	98.43598
Debt-to-Assets Ratio (DAR)	4817	.3732606	.1545312	0	.8233181
Dividend Payout Ratio	3987	.9197756	1.153577	0	5.414926
Return on Equity (ROE)	4817	.0704203	.2301678	-2.335269	1.550149
Asset Tangibility Ratio (ATR)	4817	.7573471	.2807639	.0304805	.980207
Tobin's Q	4810	1.083291	.9022407	.2412126	15.21571
Board Composition (BDC)	4789	8.740238	2.907616	1	24
Leadership Structure (LDS)	4826	.2927891	.4550896	0	1
Property Market Concentration (PMC)	4818	.1350286	.1953355	.0147007	1
Economic Growth Rate (EGR)	4826	2.239434	3.080765	-10.94007	16.25561
Foreign Investment Inflows (FII)	4826	6.676163	12.16942	-32.54697	58.51837
Consumer Price Inflation (CPIN)	4810	2.808821	2.630512	-2.540315	72.30884
Institutional Quality (IQ)	4826	1.082264	.5663844	-1.091121	1.852423
Credit Market Development (CMD)	4826	157.5569	51.30012	32.95084	258.9028
Urban Population Growth	4787	1.047926	1.036181	-10.88411	11.66571

4.2 Correlation Matrix

Table 4 presents the correlation matrix. CSS is negatively correlated with FC ($r = -0.344$, $p < 0.01$), indicating that higher sustainability performance associates with lower financial constraints. Among the pillars, Environmental and Social Performance show stronger negative correlations with FC (−0.379 and −0.274 respectively, $p < 0.01$) than Governance Performance (−0.179, $p < 0.01$), an early signal, confirmed in the regression results below, that Environmental and Social performance carry more explanatory weight than Governance in this sector. Among the controls, the Debt-to-Assets Ratio correlates positively with FC ($r = 0.078$, $p < 0.01$), Asset Tangibility correlates positively with FC ($r = 0.234$, $p < 0.01$), and Board Composition correlates negatively with FC ($r = -0.438$, $p < 0.01$). Foreign Investment Inflows correlates negatively with FC ($r = -0.327$, $p < 0.01$). Among the control variables, Property Market Concentration and Credit Market Development show the strongest pairwise correlation ($r = -0.620$, $p < 0.01$).

Overall, the correlation patterns align with theoretical expectations, highlighting the negative association between ESG performance and financial constraints while controlling for firm- and country-level characteristics. This provides preliminary support for the hypothesis that stronger sustainability practices, particularly in the environmental and social dimensions, are linked to easier access to finance for real estate firms.

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

Table 4

Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
(1) Financial Constraints (FC)	1																		
(2) Composite Sustainability Score (CSS)	-0.344***	1																	
(3) Environmental Performance (ENV)	-0.379***	0.892***	1																
(4) Social Performance (SOC)	-0.274***	0.881***	0.739***	1															
(5) Governance Performance (GOV)	-0.179***	0.705***	0.386***	0.470***	1														
(6) Debt-to-Assets Ratio (DAR)	0.0778***	-0.0514***	-0.0714***	-0.0276*	0.00810	1													
(7) Dividend Payout Ratio	0.107***	0.00933	-0.0174	0.0173	0.0516***	0.262***	1												
(8) Return on Equity (ROE)	-0.0708***	-0.0216	-0.0218	-0.00772	-0.0162	-0.0699***	-0.295***	1											
(9) Asset Tangibility Ratio (ATR)	0.234***	0.0757***	0.0758***	0.0890***	0.0462***	0.317***	0.247***	-0.0591***	1										
(10) Tobin's Q	0.156***	-0.0604***	-0.0960***	-0.0379***	-0.00986	0.0941***	0.0573***	-0.00676	0.102***	1									
(11) Board Composition (BDC)	-0.438***	0.280***	0.295***	0.239***	0.143***	-0.0894***	-0.0434***	0.00412	-0.153***	-0.101***	1								
(12) Leadership Structure (LDS)	-0.0584***	-0.00866	-0.00154	0.0283**	-0.0380***	0.164***	0.131***	-0.00172	-0.0475***	0.0671***	0.0624***	1							
(13) Property Market Concentration (PMC)	0.0495***	-0.134***	-0.0796***	-0.136***	-0.149***	-0.132***	-0.178***	0.0197	-0.106***	-0.106***	0.0528***	-0.149***	1						
(14) Economic Growth Rate (EGR)	0.00669	-0.0789***	-0.108***	-0.0688***	-0.00838	-0.0462***	-0.0654***	0.0676***	-0.0842***	0.0116	-0.00283	-0.0123	0.0512***	1					
(15) Foreign Investment Inflows (FII)	-0.327***	0.0765***	0.124***	0.0306**	0.00972	-0.273***	-0.148***	0.0210	-0.299***	-0.200***	0.203***	0.0272*	-0.140***	0.0179	1				
(16) Consumer Price Inflation (CPIN)	0.0461***	0.0411***	0.00666	0.00801	0.0930***	-0.0484***	0.0305*	-0.0466***	-0.0422***	-0.0524***	0.0124	-0.0133	0.0560***	0.237***	-0.0330**	1			
(17) Institutional Quality (IQ)	0.0953***	0.0677***	0.0843***	0.0942***	-0.0118	0.0687***	0.0584***	0.0259*	0.344***	0.0590***	-0.194***	-0.0320**	-0.379***	-0.107***	0.205***	-0.226***	1		
(18) Credit Market Development (CMD)	-0.216***	0.0657***	0.0512***	0.0563***	0.0773***	0.110***	0.148***	-0.0215	-0.0946***	0.0810***	0.0882***	0.257***	-0.620***	-0.116***	0.344***	-0.169***	0.282***	1	
(19) Urban Population Growth	0.0900***	-0.109***	-0.129***	-0.0920***	-0.0431***	-0.0991***	-0.0332**	-0.00413	-0.0397***	-0.0292**	-0.0301**	-0.103***	0.190***	0.0803***	-0.149***	0.136***	-0.272***	-0.333***	1

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

4.3 Impact of Overall Sustainability Performance on Financial Constraints

Table 5 reports the baseline results. CSS is negative and significant across all three columns, full sample ($\beta = -0.0179$, $p < 0.01$), REITs ($\beta = -0.0129$, $p < 0.05$) and M&D ($\beta = -0.0306$, $p < 0.01$), indicating that stronger sustainability performance is associated with lower financial constraints throughout the sector, with the effect roughly 2.4 times larger for M&D firms than for REITs. This is consistent with sustainability performance signaling lower risk and stronger stakeholder alignment. This direction matches studies outside real estate that link stronger CSR or ESG performance to lower capital constraints (Cheng et al., 2014; García-Sánchez et al., 2019; Guo et al., 2024) and the real estate debt market evidence for REITs (Feng & Wu, 2023) and Chinese developers (Wang et al., 2026). The real estate studies use other outcomes, so the comparison concerns direction and not size. The larger coefficient for M&D firms fits Wang et al. (2026), who find that ESG performance lowers financing costs and refinancing pressure for developers. For REITs, Feng and Wu (2023) find that disclosure is sensitive to institutional ownership, which may mean that sustainability information adds less for investors who already monitor these firms.

Among firm-level controls, the Debt-to-Assets Ratio is positive and significant in the full sample ($\beta = 3.26$, $p < 0.01$) and particularly for REITs ($\beta = 4.89$, $p < 0.01$), but not for M&D, suggesting that higher leverage heightens refinancing risk more for REITs' regulated capital structures than for M&D firms' project-based financing. This agrees with Dogan et al. (2019), who find that REITs required to pay out most of their income carry the highest book debt ratios, so debt terms matter more for REIT financing. The Dividend Payout Ratio is positive and significant across all three columns, consistent with a high payout constraining the retention of internal funds. Tobin's Q is positive and significant only in the full sample, while Return on Equity is negative and significant in the full sample and M&D, confirming that more profitable firms face fewer financing barriers outside the REIT segment specifically. Asset Tangibility is negative and significant for REITs alone ($\beta = -4.14$, $p < 0.05$), consistent with collateral-based lending theory (Giambona et al., 2008; Morri & Beretta, 2008) applying more directly to REITs' asset-heavy, income-producing portfolios than to M&D firms' project-based holdings. Board Composition is negative and significant for REITs ($\beta = -0.147$, $p < 0.05$), suggesting that larger boards are associated with fewer financing frictions in that segment specifically; Leadership Structure is not significant in any column.

Among country-level controls, Consumer Price Inflation is positive and significant in the full sample ($p < 0.10$) but negative and significant for REITs ($p < 0.01$). Institutional Quality is negative and significant for the full sample and REITs but not M&D, and Credit Market Development is negative and significant only in the full sample. Property Market Concentration is not significant in any column. The institutional quality and credit market results are consistent with the view that institutional conditions shape financing access (Hayar et al., 2025; Wang et al., 2026).

4.3.1 Developed and Developing Economies. Tables 6 and 7 split the sample by development status, classified following the United Nations World Economic Situation and Prospects (WESP) report. In developed economies (Table 6), CSS is not significant in any column, full sample ($p = 0.188$), REITs ($p = 0.138$) or M&D ($p = 0.448$). In developing economies (Table 7), CSS is negative and significant in the full sample ($\beta = -0.0344$, $p < 0.01$) and M&D ($\beta = -0.0377$, $p < 0.01$), roughly double the pooled coefficients, though not significant for REITs ($p = 0.836$). The full-sample coefficient is about twice its pooled value (-0.0179). This pattern matches the direction reported by Braun et al. (2025), who find that high ESG ratings are linked to reduced financial constraints in emerging markets. Their approach rests on investment behavior and not on the Whited and Wu index, so the comparison concerns direction only. Wang et al. (2026) also find that the financing benefit of ESG varies with the financing environment. Within R^2 values are higher in developing economies (0.386–0.500 across the three columns) than in developed economies (0.269–0.400), indicating that sustainability and firm-fundamental variation explain a greater share of financing-constraint differences where external financing barriers are more binding. Together, these results indicate that the sustainability-constraints relationship identified in the pooled sample is driven predominantly by developing-economy firms, and specifically by M&D firms rather than REITs.

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

Table 5

Impact of ESG on Financial Constraints

	(1)	(2)	(3)
	Full Sample	**REITs**	**RE Management & Development**
Composite Sustainability Score (CSS)	-0.0179***	-0.0129**	-0.0306***
	[0.001]	[0.035]	[0.002]
Debt-to-Assets Ratio (DAR)	3.2625***	4.8915***	0.8058
	[0.007]	[0.000]	[0.595]
Dividend Payout Ratio	0.1670***	0.1846***	0.2482**
	[0.002]	[0.001]	[0.015]
Tobin's Q	0.3987**	0.2513	0.2988
	[0.014]	[0.344]	[0.123]
Return on Equity (ROE)	-2.9025**	-1.4664	-5.8578**
	[0.033]	[0.285]	[0.015]
Asset Tangibility Ratio (ATR)	-0.9251	-4.1417**	1.7163
	[0.545]	[0.043]	[0.377]
Board Composition (BDC)	-0.0608	-0.1472**	-0.0376
	[0.143]	[0.023]	[0.501]
Leadership Structure (LDS)	-0.0507	0.4437	-0.4620
	[0.811]	[0.162]	[0.118]
Property Market Concentration (PMC)	0.8585	-0.2377	0.4760
	[0.210]	[0.782]	[0.658]
Economic Growth Rate (EGR)	0.0379	0.0348	0.0418
	[0.193]	[0.221]	[0.320]
Foreign Investment Inflows (FII)	-0.0009	0.0002	0.0048
	[0.890]	[0.989]	[0.628]
Consumer Price Inflation (CPIN)	0.0733*	-0.0726***	0.0658
	[0.091]	[0.000]	[0.173]
Institutional Quality (IQ)	-1.7986**	-2.9077**	0.2936
	[0.011]	[0.012]	[0.786]
Credit Market Development (CMD)	-0.0189***	-0.0064	-0.0035
	[0.002]	[0.386]	[0.760]
Urban Population Growth	-0.0018	0.0943*	-0.0262
	[0.972]	[0.054]	[0.688]
Constant	-30.9562***	-27.8042***	-35.8193***
	[0.000]	[0.000]	[0.000]
Observations	3791	2066	1725
R-sq Within	0.2779	0.3704	0.3767
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Note. p-values in square brackets. ***p < 0.01, **p < 0.05, *p < 0.1.

The control variables diverge sharply by development status. Tobin's Q and Return on Equity are not significant anywhere in developed economies but are significant across all three columns in developing economies, indicating that growth opportunities and profitability matter more for easing constraints where external capital is less readily available. Asset Tangibility is negative and significant in developed economies, consistent with collateral-based lending, but positive and significant in developing economies for the full sample and M&D, suggesting that tangible assets do not convert into financing capacity in the same way where property-rights enforcement and collateral infrastructure are less developed. Credit Market Development is flat and statistically insignificant in developed economies but significant across all three columns in developing economies. As a complementary test, an interaction between CSS and Institutional Quality was estimated on the pooled sample; the interaction term was not significant (p = 0.563), indicating that the developed-developing distinction captures a broader set of institutional and market-structure

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

differences, REIT regulatory regimes, disclosure mandates, capital market depth, than governance quality alone.

Table 6

Impact of ESG on Financial Constraints in Developed Economies

	(1) Full Sample	(2) REITs	(3) RE Management & Development
Composite Sustainability Score (CSS)	-0.0087	-0.0095	-0.0149
	[0.188]	[0.138]	[0.448]
Debt-to-Assets Ratio (DAR)	3.7057***	4.5649***	2.1734
	[0.003]	[0.001]	[0.237]
Dividend Payout Ratio	0.1763***	0.1871***	0.4023**
	[0.002]	[0.001]	[0.018]
Tobin's Q	0.2389	0.1878	0.0579
	[0.141]	[0.480]	[0.797]
Return on Equity (ROE)	-1.8349	-1.1331	-3.6348
	[0.141]	[0.380]	[0.154]
Asset Tangibility Ratio (ATR)	-4.9037***	-4.1357*	-5.8730*
	[0.006]	[0.074]	[0.097]
Board Composition (BDC)	-0.1207**	-0.1890***	-0.0794
	[0.027]	[0.009]	[0.282]
Leadership Structure (LDS)	0.1135	0.4570	-0.5040
	[0.669]	[0.161]	[0.238]
Property Market Concentration (PMC)	-0.4034	-0.0376	-0.9210
	[0.744]	[0.964]	[0.799]
Economic Growth Rate (EGR)	0.0732	-0.0046	0.1957
	[0.220]	[0.903]	[0.260]
Foreign Investment Inflows (FII)	-0.0122	-0.0063	-0.0058
	[0.161]	[0.606]	[0.718]
Consumer Price Inflation (CPIN)	0.1265**	-0.0190	0.0409
	[0.034]	[0.839]	[0.728]
Institutional Quality (IQ)	-2.1272*	-1.0805	-1.7073
	[0.091]	[0.357]	[0.648]
Credit Market Development (CMD)	0.0001	0.0060	0.0162
	[0.989]	[0.497]	[0.465]
Urban Population Growth	0.0020	0.3670	-0.0266
	[0.993]	[0.181]	[0.953]
Constant	-28.9464***	-32.0799***	-30.1486***
	[0.000]	[0.000]	[0.001]
Observations	2497	1811	686
R-sq Within	0.2686	0.3999	0.3125
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Note. p-values in square brackets. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 7

Impact of ESG on Financial Constraints in Developing Economies

	(1) Full Sample	(2) REITs	(3) RE Management & Development
Composite Sustainability Score (CSS)	-0.0344***	-0.0036	-0.0377***
	[0.000]	[0.836]	[0.000]
Debt-to-Assets Ratio (DAR)	2.0783	1.0688	0.0963

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

	(1) Full Sample	(2) REITs	(3) RE Management & Development
	[0.250]	[0.693]	[0.957]
Dividend Payout Ratio	0.0662	-0.1351	0.1715*
	[0.433]	[0.536]	[0.089]
Tobin's Q	1.1785***	4.1747***	0.9815**
	[0.002]	[0.005]	[0.013]
Return on Equity (ROE)	-8.6355***	-8.5362*	-9.2598***
	[0.000]	[0.088]	[0.000]
Asset Tangibility Ratio (ATR)	5.0127***	-2.9082	6.3015***
	[0.007]	[0.509]	[0.002]
Board Composition (BDC)	-0.0357	0.0436	-0.0414
	[0.606]	[0.767]	[0.589]
Leadership Structure (LDS)	0.0180	1.1023	-0.1700
	[0.962]	[0.191]	[0.667]
Property Market Concentration (PMC)	0.2526	1.0658	0.1068
	[0.765]	[0.683]	[0.905]
Economic Growth Rate (EGR)	-0.0016	0.0864	-0.0124
	[0.963]	[0.526]	[0.740]
Foreign Investment Inflows (FII)	-0.0022	0.0028	0.0022
	[0.857]	[0.913]	[0.866]
Consumer Price Inflation (CPIN)	0.0268	-0.0651*	0.0421
	[0.512]	[0.078]	[0.480]
Institutional Quality (IQ)	-2.5603***	-7.4284***	-1.4668*
	[0.001]	[0.007]	[0.083]
Credit Market Development (CMD)	-0.0488***	-0.0474**	-0.0349***
	[0.000]	[0.034]	[0.002]
Urban Population Growth	0.0077	0.0924	-0.0677
	[0.899]	[0.515]	[0.297]
Constant	-31.0634***	-27.5383***	-32.6854***
	[0.000]	[0.000]	[0.000]
Observations	1294	255	1039
R-sq Within	0.4116	0.3859	0.5000
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Note. p-values in square brackets. ***p < 0.01, **p < 0.05, *p < 0.1.

4.4 Environmental Performance Results

Table 8 shows Environmental Performance (ENV) negative and significant in the full sample (β = −0.0098, p < 0.05) and M&D (β = −0.0223, p < 0.01), but not REITs (p = 0.123). Table 9 shows no significant ENV effect anywhere in developed economies. Table 10 shows ENV negative and significant in developing economies for the full sample (β = −0.0202, p < 0.01) and M&D (β = −0.0225, p < 0.01), but the REIT coefficient is positive and far from significant (p = 0.870). Environmental performance therefore eases financial constraints for M&D firms specifically, concentrated in developing economies, and shows no reliable relationship for REITs under any specification.

Table 8

Impact of Environmental Performance on Financial Constraints

	(1) Full Sample	(2) REITs	(3) RE Management & Development
Environmental Performance	-0.0098**	-0.0065	-0.0223***
	[0.017]	[0.123]	[0.001]
Debt-to-Assets Ratio (DAR)	3.2618***	4.8949***	0.6979
	[0.007]	[0.000]	[0.652]

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

	(1)	(2)	(3)
	Full Sample	REITs	RE Management & Development
Dividend Payout Ratio	0.1679***	0.1856***	0.2460**
	[0.002]	[0.001]	[0.016]
Tobin's Q	0.3963**	0.2449	0.2974
	[0.015]	[0.359]	[0.130]
Return on Equity (ROE)	-2.8620**	-1.4338	-5.8137**
	[0.035]	[0.298]	[0.014]
Asset Tangibility Ratio (ATR)	-0.9196	-4.1635**	1.7018
	[0.546]	[0.040]	[0.383]
Board Composition (BDC)	-0.0579	-0.1453**	-0.0380
	[0.163]	[0.024]	[0.482]
Leadership Structure (LDS)	-0.0222	0.4872	-0.4583
	[0.916]	[0.117]	[0.121]
Property Market Concentration (PMC)	0.9381	-0.1339	0.5292
	[0.169]	[0.876]	[0.614]
Economic Growth Rate (EGR)	0.0379	0.0342	0.0450
	[0.191]	[0.231]	[0.282]
Foreign Investment Inflows (FII)	-0.0017	-0.0005	0.0029
	[0.801]	[0.971]	[0.758]
Consumer Price Inflation (CPIN)	0.0729*	-0.0700***	0.0550
	[0.084]	[0.000]	[0.254]
Institutional Quality (IQ)	-1.7975**	-2.8391**	0.2318
	[0.012]	[0.015]	[0.831]
Credit Market Development (CMD)	-0.0183***	-0.0066	-0.0003
	[0.002]	[0.375]	[0.978]
Urban Population Growth	-0.0060	0.0922*	-0.0289
	[0.907]	[0.060]	[0.665]
Constant	-31.4715***	-28.1712***	-36.6907***
	[0.000]	[0.000]	[0.000]
Observations	3791	2066	1725
R-sq Within	0.2766	0.3687	0.3787
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Note. p-values in square brackets. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 9 shows no significant ENV effect anywhere in developed economies. Table 10 shows ENV negative and significant in developing economies for the full sample (β = −0.0202, p < 0.01) and M&D (β = −0.0225, p < 0.01), but the REIT coefficient is positive and far from significant (p = 0.870). Environmental performance therefore eases financial constraints for M&D firms specifically, concentrated in developing economies, and shows no reliable relationship for REITs under any specification.

Table 9

Impact of Environmental Performance on Financial Constraints in Developed Economies

	(1)	(2)	(3)
	Full Sample	REITs	RE Management & Development
Environmental Performance	-0.0045	-0.0049	-0.0197
	[0.376]	[0.271]	[0.160]
Debt-to-Assets Ratio (DAR)	3.6942***	4.5619***	2.0546
	[0.004]	[0.002]	[0.261]
Dividend Payout Ratio	0.1761***	0.1871***	0.3955**
	[0.002]	[0.001]	[0.022]
Tobin's Q	0.2374	0.1831	0.0572
	[0.144]	[0.494]	[0.800]
Return on Equity (ROE)	-1.8147	-1.1067	-3.6585
	[0.146]	[0.393]	[0.147]

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

	(1)	(2)	(3)
	Full Sample	REITs	RE Management & Development
Asset Tangibility Ratio (ATR)	-4.8829***	-4.1113*	-6.0256*
	[0.007]	[0.077]	[0.094]
Board Composition (BDC)	-0.1207**	-0.1882***	-0.0785
	[0.027]	[0.009]	[0.289]
Leadership Structure (LDS)	0.1330	0.4919	-0.5331
	[0.611]	[0.125]	[0.213]
Property Market Concentration (PMC)	-0.3195	0.0471	-1.0106
	[0.797]	[0.953]	[0.781]
Economic Growth Rate (EGR)	0.0732	-0.0053	0.2002
	[0.218]	[0.887]	[0.244]
Foreign Investment Inflows (FII)	-0.0123	-0.0069	-0.0039
	[0.169]	[0.576]	[0.809]
Consumer Price Inflation (CPIN)	0.1293**	-0.0139	0.0452
	[0.031]	[0.883]	[0.706]
Institutional Quality (IQ)	-2.0641	-0.9660	-1.4437
	[0.110]	[0.413]	[0.685]
Credit Market Development (CMD)	0.0004	0.0062	0.0177
	[0.961]	[0.475]	[0.419]
Urban Population Growth	-0.0033	0.3593	0.0040
	[0.989]	[0.195]	[0.993]
Constant	-29.3015***	-32.5419***	-30.6113***
	[0.000]	[0.000]	[0.001]
Observations	2497	1811	686
R-sq Within	0.2682	0.3991	0.3163
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Note. p-values in square brackets. ***p < 0.01, **p < 0.05, *p < 0.1.

The environmental pillar follows the composite pattern for M&D firms but not for REITs. The composite score is significant for REITs in the pooled sample (β = −0.0129) while the environmental pillar is not (β = −0.0065, p = 0.123), so the REIT composite result does not come from this pillar. For M&D firms the result fits the legitimacy argument in Section 2.3 that visible environmental commitments matter in a sector with high environmental exposure (Suchman, 1995). The environmental result also reach agreement in direction with Cheng et al. (2014), who find that the relation between CSR performance and capital constraints is driven by both the social and the environmental dimensions although their sample covers firms in general and not real estate. The results are also in line with evidence that banks with higher ESG scores hold smaller shares of real estate and construction loans (Bressan, 2024), which suggests that lenders attach weight to the environmental risk of property lending. The development-status pattern follows the reading in Section 4.3.1.

Table 10

Impact of Environmental Performance on Financial Constraints in Developing Economies

	(1)	(2)	(3)
	Full Sample	REITs	RE Management & Development
Environmental Performance	-0.0202***	0.0026	-0.0225***
	[0.001]	[0.870]	[0.001]
Debt-to-Assets Ratio (DAR)	1.9777	1.0142	0.0369
	[0.279]	[0.704]	[0.984]
Dividend Payout Ratio	0.0667	-0.1382	0.1592
	[0.438]	[0.524]	[0.124]
Tobin's Q	1.1986***	4.2287***	1.0054**
	[0.002]	[0.004]	[0.012]
Return on Equity (ROE)	-8.5883***	-8.7192*	-9.1599***
	[0.000]	[0.080]	[0.000]

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

	(1)	(2)	(3)
	Full Sample	REITs	RE Management & Development
Asset Tangibility Ratio (ATR)	4.9286***	-2.9342	6.2854***
	[0.008]	[0.523]	[0.002]
Board Composition (BDC)	-0.0184	0.0388	-0.0262
	[0.789]	[0.769]	[0.727]
Leadership Structure (LDS)	0.0580	1.1073	-0.1491
	[0.880]	[0.170]	[0.710]
Property Market Concentration (PMC)	0.3499	1.3015	0.2116
	[0.677]	[0.639]	[0.810]
Economic Growth Rate (EGR)	0.0063	0.0955	-0.0049
	[0.865]	[0.503]	[0.899]
Foreign Investment Inflows (FII)	-0.0045	0.0010	-0.0005
	[0.712]	[0.969]	[0.971]
Consumer Price Inflation (CPIN)	0.0276	-0.0627*	0.0387
	[0.480]	[0.084]	[0.521]
Institutional Quality (IQ)	-2.6102***	-7.5531***	-1.4751*
	[0.001]	[0.009]	[0.091]
Credit Market Development (CMD)	-0.0472***	-0.0483**	-0.0319***
	[0.000]	[0.033]	[0.004]
Urban Population Growth	0.0054	0.0932	-0.0698
	[0.930]	[0.529]	[0.305]
Constant	-32.1247***	-27.5211***	-34.0664***
	[0.000]	[0.000]	[0.000]
Observations	1294	255	1039
R-sq Within	0.4085	0.3859	0.4976
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Note. p-values in square brackets. ***p < 0.01, **p < 0.05, *p < 0.1.

4.5 Social Performance Results

Table 11 shows Social Performance (SOC) negative and significant across all three columns in the pooled sample, full (β = −0.0173, p < 0.01), REITs (β = −0.0115, p < 0.05) and M&D (β = −0.0177, p < 0.05). Table 13 shows SOC negative and significant in developing economies for the full sample (β = −0.0273, p < 0.01) and M&D (β = −0.0263, p < 0.01), and at the 10% level for REITs (β = −0.0115, p = 0.070), the only instance across all three pillars where a REIT coefficient reaches significance in a development-status subsample. This indicates that the pooled REIT-level significance in Table 11 is driven by developing-economy REITs specifically; developed-economy REITs show no social effect (p = 0.180). The social pillar is the only one that is significant for REITs in the pooled sample (β = −0.0115, p = 0.039), which is consistent with the composite result for REITs in Table 5 coming mainly from this pillar. The social result also agrees in direction with Cheng et al. (2014), as noted in Section 4.4. The development-status pattern follows the reading in Section 4.3.1. For REITs the coefficient is negative and significant at the 10% level in developing economies (β = −0.0115, p = 0.070) and smaller and not significant in developed economies (β = −0.0081, p = 0.180).

Table 11

Impact of Social Performance on Financial Constraints

	(1)	(2)	(3)
	Full Sample	REITs	RE Management & Development
Social Performance	-0.0173***	-0.0115**	-0.0177**
	[0.000]	[0.039]	[0.021]
Debt-to-Assets Ratio (DAR)	3.2555***	4.7932***	0.9597
	[0.007]	[0.000]	[0.531]
Dividend Payout Ratio	0.1650***	0.1830***	0.2458**
	[0.002]	[0.001]	[0.016]

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

	(1)	(2)	(3)
	Full Sample	REITs	RE Management & Development
Tobin's Q	0.3976**	0.2644	0.2983
	[0.014]	[0.313]	[0.124]
Return on Equity (ROE)	-2.9944**	-1.5024	-5.8699**
	[0.028]	[0.275]	[0.013]
Asset Tangibility Ratio (ATR)	-0.9600	-4.1903**	1.7208
	[0.532]	[0.041]	[0.377]
Board Composition (BDC)	-0.0623	-0.1500**	-0.0264
	[0.135]	[0.020]	[0.637]
Leadership Structure (LDS)	-0.0174	0.4558	-0.4298
	[0.934]	[0.150]	[0.148]
Property Market Concentration (PMC)	0.8292	-0.2695	0.6047
	[0.229]	[0.756]	[0.579]
Economic Growth Rate (EGR)	0.0355	0.0335	0.0416
	[0.225]	[0.228]	[0.325]
Foreign Investment Inflows (FII)	-0.0014	-0.0009	0.0063
	[0.842]	[0.945]	[0.533]
Consumer Price Inflation (CPIN)	0.0704*	-0.0695***	0.0687
	[0.084]	[0.000]	[0.153]
Institutional Quality (IQ)	-1.6511**	-2.7208**	0.3823
	[0.021]	[0.020]	[0.730]
Credit Market Development (CMD)	-0.0179***	-0.0066	-0.0025
	[0.003]	[0.369]	[0.830]
Urban Population Growth	-0.0016	0.0936*	-0.0274
	[0.975]	[0.059]	[0.678]
Constant	-31.1206***	-27.8789***	-36.5535***
	[0.000]	[0.000]	[0.000]
Observations	3791	2066	1725
R-sq Within	0.2792	0.3706	0.3732
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Note. p-values in square brackets. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 12

Impact of Social Performance on Financial Constraints in Developed Economies

	(1)	(2)	(3)
	Full Sample	REITs	RE Management & Development
Social Performance	-0.0089	-0.0081	-0.0044
	[0.139]	[0.180]	[0.766]
Debt-to-Assets Ratio (DAR)	3.6940***	4.4549***	2.2509
	[0.003]	[0.002]	[0.219]
Dividend Payout Ratio	0.1760***	0.1871***	0.4029**
	[0.002]	[0.001]	[0.016]
Tobin's Q	0.2400	0.1996	0.0545
	[0.137]	[0.451]	[0.808]
Return on Equity (ROE)	-1.8658	-1.1488	-3.6284
	[0.134]	[0.375]	[0.152]
Asset Tangibility Ratio (ATR)	-4.9298***	-4.1615*	-5.7639
	[0.006]	[0.073]	[0.106]
Board Composition (BDC)	-0.1215**	-0.1898***	-0.0827
	[0.025]	[0.008]	[0.269]
Leadership Structure (LDS)	0.1312	0.4712	-0.4891
	[0.621]	[0.148]	[0.249]
Property Market Concentration (PMC)	-0.3993	-0.0312	-0.7063
	[0.751]	[0.970]	[0.848]

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

	(1)	(2)	(3)
	Full Sample	REITs	RE Management & Development
Economic Growth Rate (EGR)	0.0733	-0.0038	0.1977
	[0.220]	[0.920]	[0.250]
Foreign Investment Inflows (FII)	-0.0125	-0.0071	-0.0057
	[0.164]	[0.578]	[0.723]
Consumer Price Inflation (CPIN)	0.1280**	-0.0144	0.0415
	[0.032]	[0.877]	[0.719]
Institutional Quality (IQ)	-1.8995	-0.8147	-1.7223
	[0.123]	[0.494]	[0.647]
Credit Market Development (CMD)	0.0005	0.0061	0.0170
	[0.956]	[0.491]	[0.447]
Urban Population Growth	-0.0096	0.3467	-0.0566
	[0.970]	[0.217]	[0.902]
Constant	-29.2062***	-32.3650***	-30.6845***
	[0.000]	[0.000]	[0.001]
Observations	2497	1811	686
R-sq Within	0.2691	0.3999	0.3114
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Note. p-values in square brackets. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 13

Impact of Social Performance on Financial Constraints in Developing Economies

	(1)	(2)	(3)
	Full Sample	REITs	RE Management & Development
Social Performance	-0.0273***	-0.0115*	-0.0263***
	[0.000]	[0.070]	[0.000]
Debt-to-Assets Ratio (DAR)	2.1065	1.4042	0.1309
	[0.243]	[0.613]	[0.942]
Dividend Payout Ratio	0.0568	-0.1432	0.1727*
	[0.506]	[0.514]	[0.094]
Tobin's Q	1.1711***	3.9420***	0.9857**
	[0.002]	[0.007]	[0.012]
Return on Equity (ROE)	-8.8733***	-8.4059	-9.4454***
	[0.000]	[0.102]	[0.000]
Asset Tangibility Ratio (ATR)	4.9259**	-2.6229	6.2069***
	[0.010]	[0.574]	[0.003]
Board Composition (BDC)	-0.0228	0.0409	-0.0167
	[0.740]	[0.786]	[0.823]
Leadership Structure (LDS)	0.0840	1.0696	-0.0950
	[0.824]	[0.180]	[0.808]
Property Market Concentration (PMC)	0.2470	0.7040	0.1789
	[0.774]	[0.758]	[0.844]
Economic Growth Rate (EGR)	-0.0027	0.0766	-0.0170
	[0.942]	[0.567]	[0.655]
Foreign Investment Inflows (FII)	-0.0018	0.0050	0.0056
	[0.882]	[0.843]	[0.670]
Consumer Price Inflation (CPIN)	0.0303	-0.0662**	0.0464
	[0.421]	[0.040]	[0.426]
Institutional Quality (IQ)	-2.5932***	-7.5734***	-1.4818*
	[0.001]	[0.005]	[0.091]
Credit Market Development (CMD)	-0.0472***	-0.0446**	-0.0343***
	[0.000]	[0.046]	[0.003]
Urban Population Growth	0.0068	0.0863	-0.0661

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

	(1) Full Sample	(2) REITs	(3) RE Management & Development
	[0.909]	[0.535]	[0.316]
Constant	-31.3902***	-27.4806***	-33.2453***
	[0.000]	[0.000]	[0.000]
Observations	1294	255	1039
R-sq Within	0.4114	0.3897	0.4965
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Note. p-values in square brackets. ***p < 0.01, **p < 0.05, *p < 0.1.

4.6 Governance Performance Results

Tables 14 through 16 report the Governance Performance (GOV) results. GOV is not significant in the pooled sample, in developed economies, or in developing economies, across all three columns in every table. Unlike Environmental and Social performance, Governance performance shows no significant relationship with financial constraints anywhere in the sample, regardless of business model or development status. This suggests that, within this sector, the governance pillar score does not carry the same financing-relevant information as environmental and social performance. External governance signals do not carry the same financing relevant information as environmental and social disclosure, possibly because governance quality is already closely tied to regulatory listing requirements that apply relatively uniformly across the sample's firms.

The governance pillar is the only one without a significant coefficient in any specification. The pooled coefficients are negative but small (β = −0.0038 to −0.0055). This agrees with Cheng et al. (2014), who attribute the relation between CSR performance and capital constraints to the social and environmental dimensions. Governance structure is not irrelevant in this sample, because Board Composition is significant for REITs in the pooled sample (Tables 5 and 14) and for the full and REIT samples in developed economies (Tables 6 and 15). One possible reading is that the governance pillar adds little beyond the board variables already in the model. The pillar score is likely to include information on board structure, which Board Composition and Leadership Structure capture directly.

Table 14

Impact of Governance Performance on Financial Constraints

	(1) Full Sample	(2) REITs	(3) RE Management & Development
Governance Performance	-0.0038	-0.0039	-0.0055
	[0.347]	[0.318]	[0.510]
Debt-to-Assets Ratio (DAR)	3.2449***	4.7765***	0.9395
	[0.007]	[0.000]	[0.540]
Dividend Payout Ratio	0.1676***	0.1846***	0.2448**
	[0.002]	[0.001]	[0.016]
Tobin's Q	0.3937**	0.2555	0.2957
	[0.016]	[0.339]	[0.131]
Return on Equity (ROE)	-2.8923**	-1.4741	-5.6864**
	[0.035]	[0.285]	[0.021]
Asset Tangibility Ratio (ATR)	-0.9105	-4.2445**	1.9121
	[0.558]	[0.040]	[0.332]
Board Composition (BDC)	-0.0588	-0.1536**	-0.0189
	[0.165]	[0.017]	[0.740]
Leadership Structure (LDS)	-0.0646	0.4279	-0.4958
	[0.764]	[0.179]	[0.105]
Property Market Concentration (PMC)	0.9251	-0.1974	0.6401
	[0.185]	[0.821]	[0.565]
Economic Growth Rate (EGR)	0.0379	0.0354	0.0444
	[0.191]	[0.212]	[0.284]

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

	(1)	(2)	(3)
	Full Sample	REITs	RE Management & Development
Foreign Investment Inflows (FII)	-0.0008	-0.0009	0.0068
	[0.904]	[0.946]	[0.496]
Consumer Price Inflation (CPIN)	0.0767*	-0.0729***	0.0813*
	[0.078]	[0.000]	[0.089]
Institutional Quality (IQ)	-1.7044**	-2.7798**	0.2993
	[0.018]	[0.017]	[0.784]
Credit Market Development (CMD)	-0.0201***	-0.0077	-0.0053
	[0.001]	[0.304]	[0.622]
Urban Population Growth	-0.0055	0.0962*	-0.0378
	[0.916]	[0.052]	[0.567]
Constant	-31.2701***	-27.7731***	-36.6987***
	[0.000]	[0.000]	[0.000]
Observations	3791	2066	1725
R-sq Within	0.2741	0.3674	0.3697
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Note. p-values in square brackets. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 15

Impact of Governance Performance on Financial Constraints in Developed Economies

	(1)	(2)	(3)
	Full Sample	REITs	RE Management & Development
Governance Performance	-0.0026	-0.0032	0.0033
	[0.583]	[0.397]	[0.840]
Debt-to-Assets Ratio (DAR)	3.6666***	4.4534***	2.2522
	[0.003]	[0.002]	[0.225]
Dividend Payout Ratio	0.1763***	0.1869***	0.4035**
	[0.002]	[0.001]	[0.014]
Tobin's Q	0.2360	0.1864	0.0517
	[0.145]	[0.485]	[0.818]
Return on Equity (ROE)	-1.8337	-1.1283	-3.6074
	[0.143]	[0.384]	[0.158]
Asset Tangibility Ratio (ATR)	-4.8848***	-4.1873*	-5.6911
	[0.007]	[0.073]	[0.107]
Board Composition (BDC)	-0.1235**	-0.1939***	-0.0847
	[0.023]	[0.007]	[0.251]
Leadership Structure (LDS)	0.1091	0.4442	-0.4928
	[0.679]	[0.175]	[0.231]
Property Market Concentration (PMC)	-0.3890	-0.0500	-0.5498
	[0.752]	[0.951]	[0.886]
Economic Growth Rate (EGR)	0.0727	-0.0051	0.1997
	[0.222]	[0.891]	[0.241]
Foreign Investment Inflows (FII)	-0.0125	-0.0070	-0.0054
	[0.148]	[0.565]	[0.749]
Consumer Price Inflation (CPIN)	0.1265**	-0.0216	0.0408
	[0.033]	[0.815]	[0.721]
Institutional Quality (IQ)	-2.0002	-0.9040	-1.7668
	[0.100]	[0.433]	[0.620]
Credit Market Development (CMD)	-0.0003	0.0056	0.0175
	[0.974]	[0.518]	[0.383]
Urban Population Growth	-0.0032	0.3641	-0.0717
	[0.990]	[0.184]	[0.877]
Constant	-29.1816***	-32.2462***	-31.0467***
	[0.000]	[0.000]	[0.000]

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

	(1)	(2)	(3)
	Full Sample	**REITs**	**RE Management & Development**
Observations	2497	1811	686
R-sq Within	0.2678	0.3984	0.3114
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Note. p-values in square brackets. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 16

Impact of Governance Performance on Financial Constraints in Developing Economies

	(1)	(2)	(3)
	Full Sample	**REITs**	**RE Management & Development**
Governance Performance	-0.0073	0.0018	-0.0104
	[0.226]	[0.890]	[0.136]
Debt-to-Assets Ratio (DAR)	2.2542	1.0149	0.2173
	[0.219]	[0.703]	[0.905]
Dividend Payout Ratio	0.0733	-0.1349	0.1700*
	[0.388]	[0.538]	[0.098]
Tobin's Q	1.1617***	4.1911***	0.9556**
	[0.003]	[0.004]	[0.019]
Return on Equity (ROE)	-8.6047***	-8.6576*	-9.1470***
	[0.000]	[0.086]	[0.000]
Asset Tangibility Ratio (ATR)	5.0458***	-2.9908	6.4429***
	[0.009]	[0.494]	[0.002]
Board Composition (BDC)	-0.0087	0.0445	-0.0071
	[0.904]	[0.772]	[0.929]
Leadership Structure (LDS)	-0.0099	1.1402	-0.2197
	[0.980]	[0.207]	[0.601]
Property Market Concentration (PMC)	0.3508	1.1845	0.1394
	[0.691]	[0.625]	[0.885]
Economic Growth Rate (EGR)	0.0001	0.0944	-0.0142
	[0.997]	[0.518]	[0.708]
Foreign Investment Inflows (FII)	0.0010	0.0008	0.0076
	[0.934]	[0.977]	[0.559]
Consumer Price Inflation (CPIN)	0.0359	-0.0627*	0.0622
	[0.397]	[0.089]	[0.296]
Institutional Quality (IQ)	-2.6874***	-7.4859***	-1.4833
	[0.001]	[0.005]	[0.104]
Credit Market Development (CMD)	-0.0522***	-0.0479**	-0.0365***
	[0.000]	[0.024]	[0.004]
Urban Population Growth	-0.0085	0.0953	-0.0815
	[0.892]	[0.507]	[0.218]
Constant	-31.5563***	-27.6117***	-33.5898***
	[0.000]	[0.000]	[0.000]
Observations	1294	255	1039
R-sq Within	0.3999	0.3858	0.4884
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Note. p-values in square brackets. ***p < 0.01, **p < 0.05, *p < 0.1.

5. Conclusion

This study examined whether the sustainability performance of listed real estate firms eases financial constraints. The sample covers 505 firms from 45 countries (275 REITs and 230 management and development firms) and 4,826 firm-years between 2010 and 2023. Financial constraints are measured with

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

the Whited and Wu (WW) index. Sustainability performance is measured by the LSEG Refinitiv composite score and by its environmental, social and governance pillars. Fixed effects regressions with firm and year effects and standard errors clustered by firm are estimated for the full sample, for each business model and for developed and developing economies. Stronger composite sustainability performance reduces financial constraints in the full sample and in both business models. The reduction is more pronounced for management and development firms than for REITs. The effect is significant in developing economies and insignificant in developed economies. Within developing economies, it is significant for management and development firms but not for REITs. At the pillar level environmental and social performance reduce financial constraints in the full sample and for management and development firms. For REITs only social performance does so. The environmental and social results are significant in developing economies and not in developed economies. Governance performance has no significant effect in any specification. These patterns are consistent with the view that sustainability information may matter more for financing in management and development firms and in developing economies, where refinancing pressure and institutional constraints are greater.

5.1 Policy Implications

The findings have implications for several groups involved in real estate finance and sustainable urban development. Managers of management and development firms may gain the most in financing terms from improving sustainability performance since the reduction in financial constraints is more pronounced for this group. Lenders and investors can treat sustainability scores as relevant information when assessing property firms, particularly management and development. Pillar-level scores add information because the social pillar is the only significant pillar for REITs and the governance pillar is not significant in any specification. The effect is significant in developing economies and not in developed economies, which suggests that disclosure requirements and green finance programs may matter more in developing economies. Easing the financing of sustainable property development also supports Sustainable Development Goal (SDG) 11, which aims to make cities and human settlements inclusive, safe, resilient and sustainable. Reporting standard setters can support this by allowing investors to observe pillar-level performance alongside composite scores and by promoting consistent definitions across rating providers.

5.2 Limitations and Future Directions of the Study

Several limitations qualify the findings. First, the fixed effects design controls for time-invariant firm characteristics and common year shocks but does not isolate a causal effect. Time-varying omitted factors and reverse causality remain possible because less constrained firms may be better placed to invest in sustainability. Second, the Whited and Wu index is a proxy built from accounting variables and may not capture every dimension of access to finance. Third, sustainability performance is measured with scores from a single provider, LSEG Refinitiv, so the results depend on its methodology and weighting. Fourth, the regression sample of 3,791 firm-years is smaller than the full sample of 4,826 firm-years because not all firm-years have complete data, and firms with complete data may differ from those without. Finally, the sample contains only listed firms, so the results may not extend to private real estate companies.

Future research could address identification through quasi-experimental settings such as changes in disclosure rules or through instrumental variable strategies. Alternative indices of financial constraints and direct measures such as the cost of debt could test the robustness of the results. Studies that use sub-category scores or green financing instruments could examine the channels behind the environmental and social results. Extending the sample to private firms and adding project-level financing data would show whether the findings hold where lenders observe projects directly.

Ethics Statement

This study adhered to all ethical standards of research during the conducting of this study. We collected data from secondary sources, and no human participants were involved in the collection of data. Therefore, there is no conflict of interest of any human participant to this study.

Author's Contributions

All author/s participated in ideation, development, and writing the manuscript. All authors read and approved the final manuscript.

Conflict of Interest Statement

The author/s declare that there is no conflict of interest regarding the publication of this article.

Funding Statement

The author/s did not receive financial support from any funding agency or external organization for the research, authorship, or publication of this article.

Data Availability

The datasets generated and analysed during the current study are available from the corresponding author upon reasonable request. The authors are committed to transparency and will provide detailed methodological information and analysis protocols upon request.

References

Adams, M., Burrows, V., & Richardson, S. (2019). *Bringing embodied carbon upfront: Coordinated action for the building and construction sector to tackle embodied carbon* [Call to action report]. World Green Building Council. https://worldgbc.org/embodied-carbon

Bai, X., Han, J., Ma, Y., & Zhang, W. (2022). ESG performance, institutional investors' preference and financing constraints: Empirical evidence from China. *Borsa Istanbul Review, 22*(Supplement 2), S157–S168. https://doi.org/10.1016/j.bir.2022.11.013

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99–120. https://doi.org/10.1177/014920639101700108

Bhatti, S. H., & Khattak, M. A. (2025). ESG ratings and firms' access to finance: An international perspective. *Journal of Development and Social Sciences, 6*(1), 385–400. https://doi.org/10.47205/jdss.2025(6-I)34

Braun, M., Marcet, F., & Raddatz, C. (2025). How do ESG firms invest? *International Review of Financial Analysis, 97*, Article 103863. https://doi.org/10.1016/j.irfa.2024.103863

Bressan, S. (2024). Environmental, social, and governance scores and loan composition inside United States banks. *Sustainability, 16*(18), Article 8075. https://doi.org/10.3390/su16188075

Brounen, D., Marcato, G., & Op 't Veld, H. (2021). Pricing ESG equity ratings and underlying data in listed real estate securities. *Sustainability, 13*(4), Article 2037. https://doi.org/10.3390/su13042037

Caldecott, B., Clark, A., Harnett, E., & Liu, F. (2026). How sustainable finance creates impact: Transmission mechanisms to the real economy. *Review of World Economics, 162*(1), 87–119. https://doi.org/10.1007/s10290-024-00541-9

Cheng, B., Ioannou, I., & Serafeim, G. (2014). Corporate social responsibility and access to finance. *Strategic Management Journal, 35*(1), 1–23. https://doi.org/10.1002/smj.2131

Dogan, Y. Y., Ghosh, C., & Petrova, M. (2019). On the determinants of REIT capital structure: Evidence from around the world. *The Journal of Real Estate Finance and Economics, 59*(2), 295–328. https://doi.org/10.1007/s11146-018-9687-7

Feng, Z., & Wu, Z. (2023). ESG disclosure, REIT debt financing and firm value. *The Journal of Real Estate Finance and Economics, 67*(3), 388–422. https://doi.org/10.1007/s11146-021-09857-x

Fernández, A., Haffner, M., & Elsinga, M. (2025). Three contradictions between ESG finance and social housing decarbonisation: A comparison of five European countries. *Housing Studies, 40*(2), 391–417. https://doi.org/10.1080/02673037.2023.2290516

Freeman, R. E. (1984). A stakeholder approach to strategic management. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.263511

García-Sánchez, I.-M., Hussain, N., Martínez-Ferrero, J., & Ruiz-Barbadillo, E. (2019). Impact of disclosure and assurance quality of corporate sustainability reports on access to finance. *Corporate Social Responsibility and Environmental Management, 26*(4), 832–848. https://doi.org/10.1002/csr.1724

Giambona, E., Harding, J. P., & Sirmans, C. F. (2008). Explaining the variation in REIT capital structure: The role of asset liquidation value. *Real Estate Economics, 36*(1), 111–137. https://doi.org/10.1111/j.1540-6229.2008.00208.x

Goel, K. K., Sapra, R., Sehrawat, N., Kumar, A., Paliwal, M., & K, P. S. (2025). Can corporate consciousness attract capital? Meta-analysing the link between corporate sustainability and access to finance.

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

Australasian Accounting, Business and Finance Journal, 19(4). https://doi.org/10.14453/aabfj.v19i4.08

GRESB. (2023, October 17). *GRESB ESG benchmarks grow to cover USD 8.8 trillion and shed light on net-zero momentum across real estate and infrastructure globally* [Press release]. https://www.gresb.com/insights/gresb-esg-benchmarks-grow-to-cover-usd-8-8-trillion-and-shed-light-on-net-zero-momentum-across-real-estate-and-infrastructure-globally/

Guo, X., Cheng, P., & Choi, B. (2024). Impact of corporate environmental uncertainty on environmental, social, and governance performance: The role of government, investors, and geopolitical risk. *PLOS ONE, 19*(8), Article e0309559. https://doi.org/10.1371/journal.pone.0309559

Hao, Y., & Wu, W. (2024). Environment, social, and governance performance and corporate financing constraints. *Finance Research Letters, 62*(Part A), Article 105083. https://doi.org/10.1016/j.frl.2024.105083

Harrison, D. M., Panasian, C. A., & Seiler, M. J. (2011). Further evidence on the capital structure of REITs. *Real Estate Economics, 39*(1), 133–166. https://doi.org/10.1111/j.1540-6229.2010.00289.x

Hayar, B., Muckenhaupt, J., & Zhu, B. (2025). The impact of ESG factors on performance of real estate equities. *Journal of Property Research, 42*(3), 201–226. https://doi.org/10.1080/09599916.2025.2455166

Hodes Weill & Associates. (2017, October 13). *Global institutional investors' average target allocation to real estate exceeds 10%, finds Hodes Weill & Associates and Cornell University* [Press release]. Business Wire China. https://www.businesswirechina.com/en/news/36147.html

Hodes Weill & Associates. (2023, November 1). *Institutional target allocations to real estate remain flat for the first time since 2013 while conviction in the asset class increases in anticipation of attractive buying opportunities, finds Hodes Weill & Associates and Cornell University* [Press release]. Business Wire. https://www.businesswire.com/news/home/20231101557054/en

Jackson, C., & Orr, A. (2021). The embeddedness of sustainability in real estate investment decision making. *Journal of European Real Estate Research, 14*(3), 362–380. https://doi.org/10.1108/JERER-09-2020-0050

Liao, Y., Marquez, R., Cheng, Z., & Li, Y. (2025). Can ESG performance sustainably reduce corporate financing constraints based on sustainability value proposition? *Sustainability, 17*(17), Article 7758. https://doi.org/10.3390/su17177758

Morri, G., & Beretta, C. (2008). The capital structure determinants of REITs. Is it a peculiar industry? *Journal of European Real Estate Research, 1*(1), 6–57. https://doi.org/10.1108/17539260810891488

Nguyen, H. H., & Nguyen, H. T. (2024). Do the ESG factors truly enhance real estate companies' valuation and performance in uncertain times. *Journal of Property Investment & Finance, 43*(2), 190–221. https://doi.org/10.1108/JPIF-03-2024-0036

Suchman, M. C. (1995). Managing legitimacy: Strategic and institutional approaches. *The Academy of Management Review, 20*(3), 571–610. https://doi.org/10.2307/258788

United Nations Framework Convention on Climate Change. (2016). *Report of the Conference of the Parties on its twenty-first session, held in Paris from 30 November to 13 December 2015. Addendum. Part two: Action taken by the Conference of the Parties at its twenty-first session* (Conference of the Parties Report FCCC/CP/2015/10/Add.1). https://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf

Wang, S., Zhang, L., & Qiao, B. (2026). When does ESG pay? Financing constraints and firm performance in China's real estate sector. *Applied Economics*, 1–18. https://doi.org/10.1080/00036846.2026.2731157

Whited, T. M., & Wu, G. (2006). Financial constraints risk. *Review of Financial Studies*, 19(2), 531–559. https://doi.org/10.1093/rfs/hhj012

World Economic Forum. (2024). *Towards green building value chains: China and beyond*. https://www.weforum.org/publications/towards-green-building-value-chains-china-and-beyond/